Battery

Type of battery

- Check that the battery used in this truck is the correct voltage as shown on the truck's data plate. Use a traction battery having a weight within the minimum/maximum values stated on the data plate.

Changing the battery

- Only replace the battery with a battery of the same weight as the original. The battery weight affects the truck's stability and its braking capacity. Information on the lowest permitted battery weight can be found on the truck's data plate.

WARNING Risk of moving the center of gravity.
A battery weight that is too low gives impaired stability and braking capacity.
The battery weight must be in accordance with the information on the truck's data plate.

When changing the battery proceed as follows:

- Park truck at battery removal station.
- Turn **OFF** key and remove.
- Push the emergency disconnect button to the **OFF** position to stop hourmeter from running.
- Disconnect the battery connector from the battery.
- Remove battery stops.

- Slide out the discharged/old battery, then slide in the new battery.
- Connect battery and truck connectors.
- Connect the battery connector and truck connector.

WARNING	**Risk of short-circuiting.** **The cables can be damaged and cause a short-circuit.** **Ensure the battery cables are not crushed.**

- Push the emergency disconnect button to the **ON** position.
- Install battery stops.

WARNING	**Falling battery.** **If the truck should tip over the battery can fall out if the battery stops have not been installed.** **Make sure the battery stops have been installed.**

WARNING	**Falling battery.** **When charging the battery, it can be dropped.** **Always lift battery using an approved lifting device, and use a battery yoke intended for the battery.**

Charging the battery

General prohibition

When recharging the battery it is absolutely forbidden to smoke or use an open flame.

Use an automatic charger intended for recharging traction batteries.

The charger must have an automatic maintenance charging feature for a certain period after the main charging period has been completed. This eliminates the risk of over charging the battery and the need to monitor the charging procedure is reduced to a minimum.

The charger shall have a minimum charging current of:

Battery (Ah)	Charger (A)
300-480	50-70
480-730	80-110
730-900	130-150

WARNING **Corrosive acid.**
The battery fluid contains sulfuric acid. Fluid spilled on skin should be rinsed OFF immediately. Wash thoroughly with soap and water.
If the fluid has come into contact with the eyes, wash the eyes immediately using an eye shower. Contact a doctor.

ALWAYS WEAR PROTECTIVE GLASSES AND PROTECTIVE GLOVES WHEN CHECKING THE BATTERY.

Pre-charging

- Park the truck in the assigned charging area.
- Ensure nothing prevents ventilation above the battery.
- Turn key switch to the **OFF** position.
- Remove the battery connector from the truck's connector.
- Make sure the battery charger is switched **OFF**.
- Connect the **battery connector to charger** connector.
- **Never** connect charger connector to truck connector.
- Switch **ON** the battery charger.

WARNING **During the charging process oxygen and hydrogen gases are always formed in the battery.**
Short circuits, open flames, and sparks in the vicinity of the battery can cause an EXPLOSION.
Always switch OFF the charger current BEFORE removing the battery connector.
Provide good ventilation, especially if the battery is recharged in a confined area.

During charging

- After approximately ten minutes make sure that the ammeter indicates a normal reading and that the control lamp is **ON**.

After charging

- Make sure that the ammeter indicates an insignificant or no reading and that maintenance charge lamp is **ON**, if equipped.

- Switch **OFF** the charger.

- Disconnect the battery connector from charger connector.

CAUTION	Risk of short circuiting. The terminals can otherwise be damaged inside and result in a subsequent short circuit. Do not pull the cables to disconnect from the charger.

Battery maintenance

Carry out battery maintenance after recharging.

WARNING **Corrosive acid.**
The battery fluid contains sulfuric acid. Fluid spilled on skin should be rinsed OFF immediately. Wash thoroughly with soap and water.
If the fluid has come into contact with the eyes, wash the eyes immediately using an eye shower. Contact a doctor.

ALWAYS WEAR PROTECTIVE GLASSES AND PROTECTIVE GLOVES WHEN CHECKING THE BATTERY.

Each week:

- Remove all cell caps.

NOTE! This does not apply to batteries with level caps or central filling.

- Check the fluid level in the cells and note any cells that consume more than a normal amount of fluid.
- Fill using distilled water. The fluid level should be 1/4 in. [10-15 mm] above the cell plates.
- Refit all of the cell caps.
- Rinse off and dry the battery.

Each month:

- Measure the temperature in one of the center cells immediately after charging. The temperature should not exceed 122°F [50°C.]

- Measure the density of the battery fluid using an acid tester. Hold the acid tester absolutely vertical and extract sufficient fluid so that the hydrometer float moves freely.

- Adjust specific gravity with temperatures based on the chart below.

Temperature	Gravity
77°F [25.2°C]	1.280

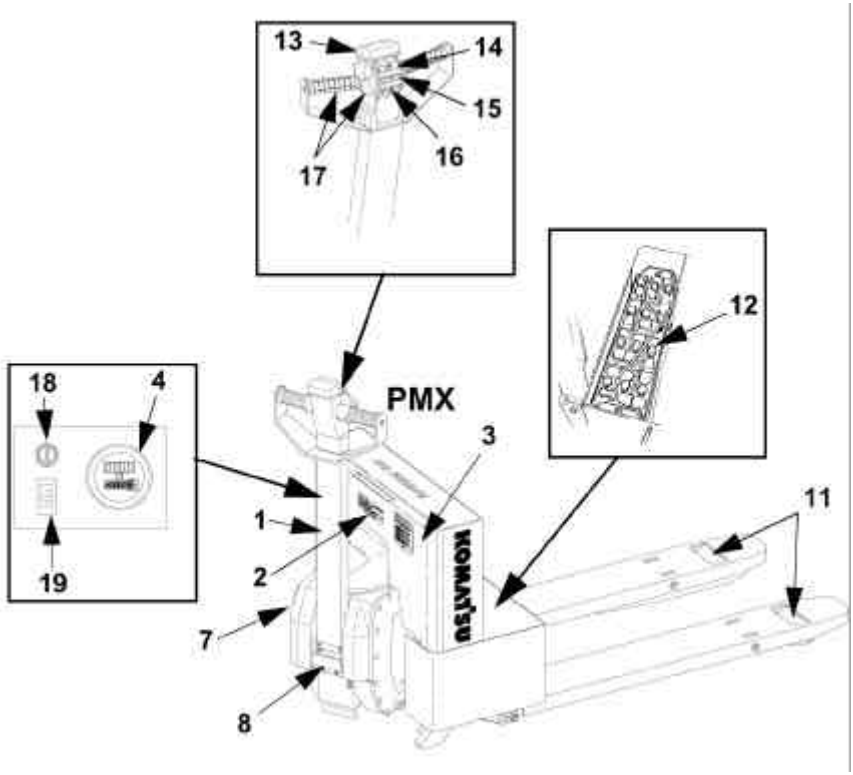
WARNING Battery manufactories maintenance and charging procedures must be followed. Battery acid is very corrosive and must be immediately cleaned up after spillage.

Daily service/safety checks

- The operator is responsible for the daily service and care of the truck.
- Carry out the daily service at the start of the day or shift, before the truck is used. The daily service is a simple safety and function control as shown in the chart.
- You need no tools to carry out the service checks.
- If you fail to carry out the daily service the safety and reliability of the truck can be affected.

WARNING **Never neglect the daily service and safety checks. Serious accidents can occur. Always report any faults or damage to your supervisor without delay. Never use a truck that does not function properly.**

Daily service/safety checks



WARNING **DO NOT continue to operate the truck when it is not functioning properly.**

Item #	Check points	Action
1	Hydraulic system	Check for oil leakage, hoses, and floor
2	Lifting device	Check for damage, noise function
3	Battery	Check acid level, charge, and condition. See **"Battery Maintenance"** section
4	Battery cables and connections	Check for breakage, cutting, or damage
5	Chassis	Check for damage, remove dirt and debris
6	Covers / guards	Check for damage, ensure placement
7	Drive unit	Inspect abnormal noises and leakage
8	Wheels	Check for damage, remove oil, metal chips, and debris
9	Hand brake	Check its function
10	Direction / speed control	Check its function
11	Hydraulic function	Check its function
12	Reverser switch	Check its function
13	Horn	Check its function
14	Running time	Inform your supervisor if your truck is ready for a schedule maintenance check. See **"Maintenance"** section
15	Emergency stop switch	Check its function
16	Key switch (toggle switch)	Check its function
17	High speed switch	Check its function

If any of the functions fail to operate properly, inform your supervisor or maintenance personnel to have the truck repaired.

Special equipment

Your truck may have been fitted with optional or special equipment that requires a routine check. To ensure safe operation consult with your supervisor and your **KOMATSU** representative about routine checks.

Maintenance

General information

- Under normal conditions ensure the truck is given a regular maintenance service after every 500 driving hours. The truck's safety, efficiency, and service life is dependent on the service and maintenance it is given.

- Only use **KOMATSU** approved spare parts when service and repair work are carried out.

- **KOMATSU** recommends that you contact your **KOMATSU** representative to set up a service and maintenance agreement to ensure your truck's operating economy and safety.

Safety regulations with maintenance work

- Only personnel that have been trained in the service and repair of this type of truck are authorized to carry out service and repair work.

- Do not carry out any maintenance work on the truck unless you have the correct training and knowledge to do so.

- Keep the area where you carry out service clean. Oil or water makes the floor slippery.

- Never wear loose objects or jewelry when working on the truck.

WARNING Short-circuiting/burns.
When working with the truck's electrical system short circuiting/burns can occur if a metal object comes into contact with live electrical connections.
Remove watches, rings, or other types of metal jewelry.

- Always switch **OFF** the truck's power supply before opening the covers on the drive unit or electrical systems.
- Always disconnect the battery by pulling out the battery connector when carrying out maintenance work on the truck unless otherwise stated in this publication or the **Service Manual**.
- Relieve the system pressure slowly before starting work on the truck's hydraulic systems.
- Use paper or a rigid sheet of cardboard when checking for oil leakage. **Never** use your hand.
- Bear in mind that the oil in the transmission or the hydraulic system can be **hot**.

WARNING Risk of burns.
Hot transmission and hydraulic oil.
Let the truck cool before changing the oil.

- Only fill the hydraulic system with new clean oil. Oil should meet **KOMATSU** cleanliness specification 12-00-002. Contact your **KOMATSU** representative for assistance or

more information.

WARNING The hydraulic system can be damaged.
If oil is contaminated hydraulic components can be damaged.
Always use new and clean oil in the hydraulic system.

- Store and dispose of changed oil in accordance with local regulations.
- **Do not** dump solvents, which are used for cleaning/ washing, into drains that are not intended for this purpose. Follow the local regulations that apply for disposal.
- When working underneath the truck support the truck on trestle-blocks.

WARNING Risk of crushing.
A badly supported truck can fall.
Never work under a truck that is not supported on trestle-blocks and secured by a lifting device.

Maintenance that can be carried out by driver

The **Daily service/Safety checks** as set out in the check list.

Maintenance points with intervals **1 day**, **1 week**, and **1 month** as set out in the **Maintenance chart** may be carried out by the driver without more knowledge than that provided by the **Operator's Manual**.

Other maintenance points as set out in the **Maintenance chart** may only be carried out by personnel who have completed maintenance training for this type of truck.

Maintenance that may be carried out by trained maintenance personnel

All maintenance points as set out in the **Maintenance chart**.

If you are uncertain regarding working procedures consult the **Service Manual** for the truck.

Other service and repair work

- In addition to the maintenance points in the **Maintenance chart** all service and repair work should be carried out by personnel with special training for this type of truck.

Cleaning and washing

General

Cleaning and washing the truck is important to ensure the truck will operate safely and reliably.

- Carry out general cleaning and washing weekly.

NOTE!
Risk of short circuiting.
The electrical system can be damaged.
Disconnect the battery before washing by pulling out the battery connector. Do not spray water directly into the electrical compartments of the truck.

External cleaning

- Remove debris, etc. from the wheels daily.
- Use a degreasing agent diluted to a suitable concentration.
- Rinse off loose grime using warm water.

NOTE!
Mechanical components can be damaged.
After washing, the truck should be lubricated as set out in the chapter Maintenance and Lubrication chart.

Cleaning the motor compartment

- Cover the electric motors, electrical compartments, connectors, and valves before washing.

- Clean carefully using the minimum of water and detergent. **Never pressure wash** or **steam clean** in the compartments.

NOTE!
Risk of short-circuiting.
The electrical system can be damaged.
Electrical components must not be cleaned with a high pressure washing unit.

- Clean the motor compartment using a degreasing agent diluted to a suitable concentration.

- Rinse off loose grime using warm water.

Electrical components

- Blow electric motors dry using compressed air.

WARNING Compressed air used for cleaning **MUST** be reduced to less than 30 psi, and then only with effective chip-guarding and personal protective equipment.

- Clean the electrical panels, electronic boards, contacts, connector, solenoid valves, etc. using a damp cloth and a cleaning agent.

- **Do not spray or pressure wash** in the compartment.

NOTE!
Risk of short-circuiting.
Electrical components can be damaged.
Do not break the warranty seal on the electronic board.

Maintenance chart

PM Interval:

A=5 Hours or 1 Day

B=20 Hours or 1 Week

C=80 Hours or 1 Month

D=250 Hours or 3 Months

E=500 Hours or 6 Months

F=1000 Hours or 12 Months

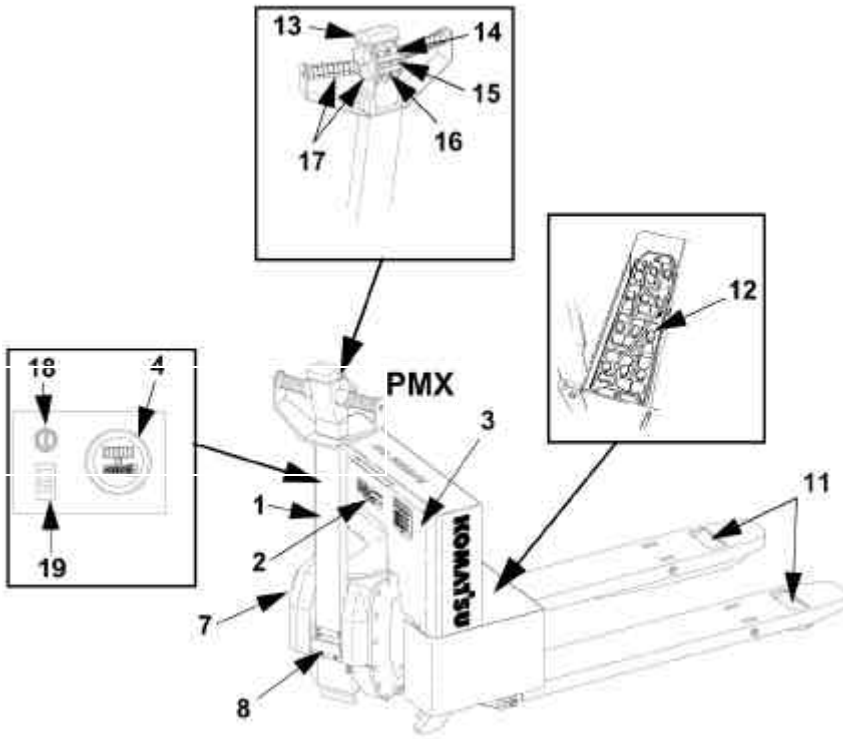
G=3000 Hours or 36 Months

No.	Action	A	B	C	D	E	F	G
1.0	Chassis							
1.1	Check that the truck's data plate is legible					X		
1.2	Check the cover screws					X		
1.3	Check door lock					X		
1.4	Check wear on battery stop					X		
1.5	Check for damage and crack formation					X		
1.6	Check fork frame mounting					X		
2.0	Motors							
2.1	Check for loose connections					X		
2.2	Clean motor					X		
2.3	Check mounting bolts				X			
2.4	Check for abnormal bearing noise					X		
2.5	Check brush wear					X		
3.0	Drive unit							
3.1	Check for leakage					X		
3.2	Check oil level					X		
3.3	Check for noises					X		
3.4	Check the mounting on support				X			
4.0	Wheels							
4.1	Remove string & debris	X						
4.2	Check all wheels for wear	X						
4.3	Check that all wheels rotate and axles are fitted correctly					X		
4.4	Check all wheels for loose screws					X		

No.	Action	A	B	C	D	E	F	G
4.5	Grease load wheel bearings				X			
4.6	Grease caster and caster wheels				X			
4.7	Dismantle and lubricate all wheel bearings.							X
5.0	Brake							
5.1	Clean					X		
5.2	Check shoes and discs for wear					X		
5.3	Check correct clearance brake					X		
5.4	Check brake operation	X						
6.0	Electrical panel							
6.1	Clean and check the mounting					X		
6.2	Tighten cable connections					X		
6.3	Check contactor tips					X		
6.4	Check the contactor tips for free movements					X		
6.5	Check all cable insulation for damage					X		
7.0	Electronic card							
7.1	Check for connections in harness connectors					X		
8.0	Electronic control system							
8.1	Check key switch	X						
8.2	Check brake switch					X		
8.3	Check control wiring harness for proper routing					X		
9.0	Battery							
9.1	Check electrolyte level, 1/2 - 5/8 in. [10-15 mm] above cell plate		X					
9.2	Check the connections on battery, truck, and charger		X					
9.3	Check all cells and pole guards			X				
9.4	Check the fluid density and temperature			X				
9.5	Check power cables are not cut or frayed	X						

No.	Action	A	B	C	D	E	F	G
10.0	Hydraulic system							
10.1	Check hoses and connections for leakage					X		
10.2	Check hoses for wear and damage					X		
10.3	Check oil tank for cracks, leaks, and mounting					X		
10.4	Check oil level					X		
10.5	Change oil						X	
11.0	Cylinder							
11.1	Check for leakage					X		
11.2	Check the mountings					X		
12.0	Lift devices							
12.1	Check for damage and cracks					X		
12.2	Check for play on the pull rods					X		
12.3	Check the electrical limit switch function	X						
12.4	Check for wear to the forks and other lifting devices					X		
12.5	Lube all grease fittings				X			
13.0	Controls							
13.1	Check handle mounting	X						
13.2	Check the handle brake lever switches	X						
13.3	Check travel direction/speed control	X						
13.4	Check horn button function	X						
13.5	Check hydraulic button functions	X						
13.6	Check the handle control switches	X						
14.0	Gauge							
14.1	Check dash display	X						
15.0	Brake Levers							
15.2	Check handle brake levers	X						
16.0	Key switch (toggle switch)							
16.1	Check switch function	X						

No.	Action	A	B	C	D	E	F	G
17.0	Emergency stop switch							
17.1	Check the emergency stop switch	X						



Maintenance chart

Lubrication chart

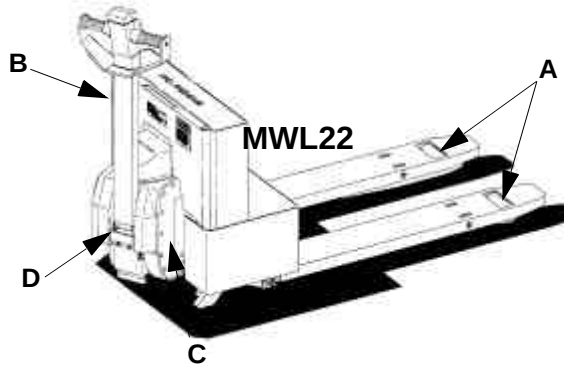
Pos No.	Service point	Interval/Running hours			Lubricant
		500h	1000h	3000h	
1	Wheel bearings			L	A
2	Hydraulic system	C	O		B
3	Travel brake	C			
4	Drive gear	C		O	C
5	Hinges		L		D
6	Steering bearings		L		A
7	Gear ring	L			A

L=Lubrication **C**=Check **O**=Oil change

Approved Oils and Grease

Pos.	Lubricant	Specification			Application area
		Above 5°F [-15°C]	Below 5°F [-15°C]	Below -10°F [-23°C]	
A	Grease	Tex. Ref. C & C #880	Tex. Ref. C & C #880	Tex. Ref. C & C #880	Bearings and bushings
B	Hydraulic oil	Sunoco TH	Sunoco TH	Texaco 15	Hydraulic system
C	Transmission oil	SAE 80W/90	SAE 75W	SAE 75W	Gears
D	Motor oil	SAE 40	SAE5W-20	SAE5W-20	Pivot

Oil should meet **KOMATSU** cleanliness specification 12-00-002. Contact your **KOMATSU** representative for assistance or for more information.



Lubrication chart location points

Transporting and storing the truck

Truck’s standard dimensions and weight

NOTE! The truck’s dimensions and weight can vary with different accessories.

Truck’s dimensions and weight

Truck data	MWL22
Height	50.4 in. [1280 mm]
Width	30.0 in. [762 mm]
Length (this length is with 48 in. [1219.2 mm] forks)	77.6 in. [1971 mm]
Minimum battery weight	350 lb [158.9 kg]
Service weight without battery (this weight is with 48 in. [1219.2 mm] forks)	850 lb [385.9 kg]

Lifting the truck

- Lift the truck from the marked lifting points when lifting using a lifting device.

WARNING Risk of overturning.
The truck can overturn if lifted from the wrong lifting points.
Always lift the truck from the marked lifting points.

WARNING Risk of overturning.
The truck can overturn if lifted incorrectly.
Always lift the truck secured to, and with the center of gravity between, the lifting truck's forks.

Towing and transporting a disabled truck

WARNING **DO NOT** tow a disabled truck.

It is not recommended to tow a disabled lift truck.

Storing the truck

Take the following action if the truck is not used for **one week** or more:

Battery

- Recharge the battery fully and carry out usual battery maintenance.

- Maintenance charge the battery every **3rd month** and check the fluid level.

Hydraulic system

- Change the oil in the hydraulic system when stored for periods longer then **1 year**. See the oil specification in the section **Maintenance and lubrication chart**.

Drive unit

- Block up the truck's drive section to take the load off the drive wheel and load wheels when storing for periods longer than **one week**.

Starting after a period of disuse

- Before the truck is put into operation after a period of disuse it should undergo a function and safety check as stated in the section **Daily service/safety checks**.

- When stored for a period **greater** then **3 months** carry out preventive maintenance as stated in the instructions **500 hours interval**.

Recycling/Discarding

Batteries are hazardous to the environment and should be returned to the manufacturer for recycling.

Discarding the battery

When the working life of the battery in the truck is at an end (change to a new battery), or if the entire truck is to be scrapped, special regard to environmental risks shall be taken when disposing/recycling batteries.

Spent batteries shall be returned/sent to the manufacturer of the battery or its representatives (see the label on the battery) for disposal/recycling. You can also return batteries to your local **KOMATSU** representative who will then return the battery to the manufacturer.

Scrapping the truck

The truck consists of parts that contain recyclable metals and plastics. Below is a list of those materials used in the truck's sub-systems.

Chassis	
Chassis	Steel
Drive unit	Steel and cast material
Bushings	Iron/copper
Finish	Epoxy-polyester
Wheels	Polyurethane

Hydraulic system	
Oil tank	Steel
Pump unit	Steel and aluminium
Hoses	Rubber and steel
Cylinders	Steel

Electrical system	
Cables	Copper cores with PVC sheaths
Electronic board	Reinforced fiberglass circuit board laminate
Motors	Steel and copper